



# Trends and Innovation in Rhinology: A Bibliometric Analysis of Patent Activity (1974-2024)

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## BACKGROUND

- Rhinology has undergone substantial innovation in recent decades, particularly in diagnostic, therapeutic, and surgical technologies that enhance outcomes for patients with sinonasal conditions.
- Despite this progress, bibliometric analysis of technological advancements through patent data **remains underexplored**.
- This study analyzes the most cited rhinology-related patents to identify key technological trends and highlight the evolution of innovations across different categories within the field.

## METHODS

- We conducted a **cross-sectional patent landscape analysis** using the Lens database, querying English-language patents with the keyword “rhinology” and Cooperative Patent Classification (CPC) code A61 from 1974 to 2024.
- After manual screening for relevance and duplicates, 521 patents were retained.
- These were ranked by forward citation count, and the top 100 were categorized into five subgroups: **Balloon and Catheter-Based Treatment, Drug Delivery Systems and Therapeutics, Non-Surgical Diagnostic Devices, Sinonasal Ablation Techniques, and Surgical Instruments and Methods**.
- Correlation between patent age and citation rank was assessed using **linear regression**.

## FIGURES

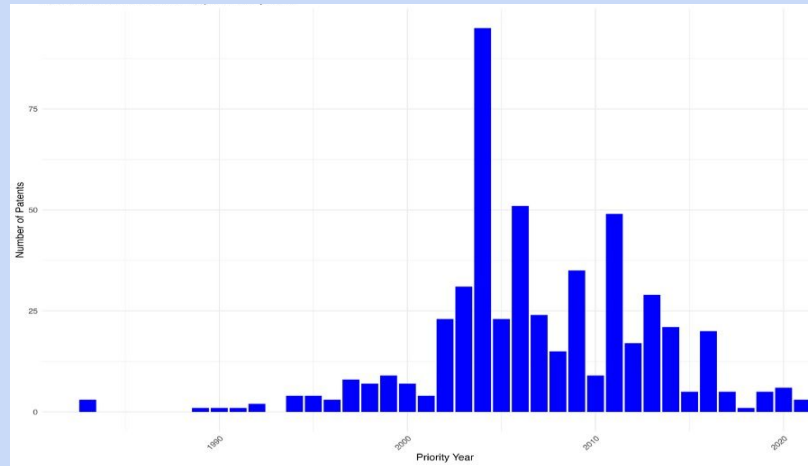


Figure 1: Number of granted patents per priority year for all patents (521)

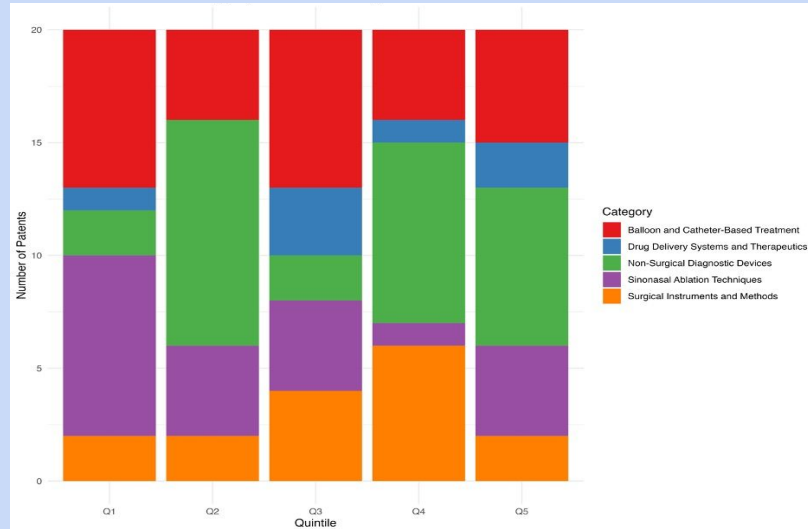


Figure 2. Top 100 patents breakdown by quintile

## RESULTS

- The top 100 cited patents were primarily filed between 2000 and 2010, with **64% still active**.
- Non-Surgical Diagnostic Devices (n=29) was the **most common category**, followed by Balloon and Catheter-Based Treatment (n=27) and Sinonasal Ablation Techniques (n=21).
- The first quintile (top 20) patents were predominantly Balloon or Ablation-based technologies. Regression analysis revealed a **weak correlation between priority year and citation rank** (Pearson’s R = 0.34, R<sup>2</sup> = 0.12), indicating older patents tend to accumulate more citations but are not the sole drivers of innovation.

## CONCLUSION

- This study is the first comprehensive analysis of rhinology patent trends, revealing dominant innovation in Non-Surgical Diagnostic Devices and Balloon-Based Treatments.
- These patents reflect **evolving clinical needs and opportunities** for less invasive, more effective solutions.
- Tracking patent trends offers valuable foresight for future research and development, helping innovators **align technological advancements with clinical demand** and optimize outcomes in rhinologic care.